Application No: 10/707, 112
Docket No.11761-US-PA
Customer No. 31561

REMARKS

Present Status of the Application

This is a full and timely response to the outstanding non-final Office Action mailed on July 7, 2004. The Office Action has rejected claims 1, 3-5 and 8-11 under 35 U.S.C. 35 U.S.C. 103(a) as being unpatentable over Yang (USP 6,426,016) in view of Wolf et al. Silicon Processing for the VLSI Era, Vol. 1 Lattice Press 1986, pp. 166-174, 182, 195, further in view of Wang et al. (US, 6291331) and Perng (US 6,523,494).

Claims 1, 3-5 and 8-11 are pending of which claims 1 and 5 have been amended to more accurately describe the invention. It is believed that no new matter is added by way of these amendments made to the claims or otherwise to the application.

Applicant has most respectfully considered the remarks set forth in this Office Action. Regarding the anticipated rejection, it is however strongly believed that the cited references are deficient to adequately teach the claimed features as recited in the amended claims. The reasons that motivate the above position of the Applicant are discussed in detail hereafter, upon which reconsideration of the claims is most earnestly solicited.

Discussion of Office Action Rejections

The Office Action rejected claims 1-11 under 35 U.S.C. § 103(a) as being unpatentable over Yang et al. (USP 6,426,016, Yang hereinafter) in view of Wolf et al., Silicon Processing

for the VLSI Era, Vol. 1, Lattice Press 1986, pp. 166-174, 182-195, further in view of Wang et al. (USP 6,291,331, Wang hereinafter), and Perng et al. (USP 6,523,494, Perng hereinafter).

Applicants respectfully submit that Yang in view Wolf and further in view of Wang and Perng is legally deficient for the purpose of rendering claims 1 and 5 unpatentable because the reference or references, taken alone or combined, fails to teach or suggest each and every element recited in the claims.

The present invention is directed to a method of forming a passivation layer directly on a metallic, and the metallic layer is prevented from structural or electrical damage due to the deposition process. To achieve such an effect, the present invention teaches in claim 1, among other things, performing a plasma-enhanced chemical vapor deposition process to form a first passivation layer directly on the metallic layer, wherein the plasma-enhanced chemical vapor deposition process is carried out at a processing pressure between about 21to 25 Torrs and with a processing power between about 1 to 600 Watts. Fabricating a passivation layer with a higher pressure and a lower processing power reduces the degree of damage to the metallic layers. The present invention also teaches in claim 5, among other things, performing a semi-atmospheric chemical vapor deposition process with liquid tetra-ethyl-ortho-silicate (TEOS) and ozone inside a reaction chamber to form a first passivation layer directly on the metallic layer, wherein the liquid tetra-ethyl-ortho-silicate flowing into the reaction chamber has a flow rate between 500 sccm to 3000 sccm and the ozone flowing into the reaction chamber has a flow rate between 5000 sccm to 15000 sccm. Fabricating a passivation layer directly on a metallic layer

using semi-atmospheric chemical vapor deposition under the claimed processing condition also eliminate the damages that may inflict upon the metallic layer associated with a plasma.

The Office first relies on Yang to teach forming a passivation layer using PECVD. There is no suggestion or teaching in Yang that performing the PECVD under certain processing conditions to prevent damages to the underlying metallic layers. Instead, Yang simply teaches forming the passivation layer on the antireflective layer 220 using PECVD. The problem that is being solved by the instant case is not even recognized by Yang The Office then relies on Wolf to teach the conventional method of deposition for silicon oxide and silicon nitride. Again, there is no suggestion in Wolf that by fabricating a passivation layer with a higher pressure and a lower processing power in a PECVD process. In fact, Wolf teaches in page 173 for PECVD reactors are operated in the pressure range of 0.1-5 torrs. Therefore, applicants respectfully submit that people skilled in the art would not easily be able to deduce from the teachings of Yang and Wolf that performing PECVD at an operating pressure and power outside the normally practiced ranges would provide protection for the metallic layer already formed on the wafer. Applicants also respectfully disagree with the Office's assertion that performing PECVD at the claimed processing pressure and power would just be an optimization of a desired characteristic of the deposited film because the claimed processing pressure and power are critical and are thus not obvious. See MPEP 2144.05, 8th edition., February 2003.

Similarly, Wang teaches performing a PECVD process at a pressure too low (2.0 to 2.8 torr at col. 7, ln. 35049) to achieve the advantages of the instant case. It is thus obvious that Wang fails to even recognize the problem of the instant case of forming a PECVD layer at high pressure directly on a metallic layer to prevent damage to the metallic layer and thus can not render the instant case obvious. Further, the SACVD oxide of Wang is conducted using TEOS and O_2 gases to resolves the problems of via cracking, while the present invention teaches using TEOS and ozone gases to mitigate damages on a metallic layer. Regarding Perng, Perng discloses a PECVD process conducted at a pressure that is too low (1-20 torr) to mitigate damage to the underlying metallic layers. Further, the SACVD layer of Perng is formed on a PECVD layer, whereas the present invention teaches the SACVD layer is formed directly on a metal layer for preventing damages being inflicted upon the metal layer.

For at least the above reasons that Yang in view Wolf and further in view of Wang and Perng fails to teach or suggest each element in the claims, Applicants respectfully assert that claims 1 and 5 patentably define over Yang in view Wolf and further in view of Wang and Perng. Since claims 3-4, 8-11 are dependent claims which further define the invention recited in claims 1 and 5, respectively, Applicants respectfully assert that these claims also are in condition for allowance. Thus, reconsideration and withdrawal of this rejection are respectively requested.

CONCLUSION

For at least the foregoing reasons, it is believed that the presently pending claims 1, 3-5, 8-11 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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